CLAIMS

1.   A method of calculating recursive state metric vectors of a block of symbols, the state metric vectors being supplied to an output calculating unit, comprising:

5   pre-calculating the state metric vectors from a first side of the block; and

calculating for a second time at least some of the state metric vectors from the first side of the block.

2.   A method according to claim 1, wherein pre-calculating the state metric vectors

10   comprises pre-calculating the state metric vectors before supplying substantially any of the vectors to the output calculating unit.

3.   A method according to claim 1, comprising storing fewer than all the pre-calculated vectors.

15   4.   A method according to claim 3, wherein calculating for a second time at least some of the state metric vectors comprises calculating those vectors which were not stored.

5.   A method according to claim 4, wherein storing fewer than all the pre-calculated

20   vectors comprises storing a number of vectors which is about the square root of the number of pre-calculated vectors.

6.   A method according to claim 3, wherein storing fewer than all the pre-calculated vectors comprises storing vectors selected responsive to the locations of singular functions

25   used in the pre-calculating of the vectors.

7.   A method according to claim 3, wherein storing fewer than all the pre-calculated vectors comprises storing vectors selected in predetermined intervals.

30   8.   A method according to claim 7, wherein storing vectors selected in predetermined intervals comprises storing vectors with equal intervals between them.

9.   A method according to claim 7, wherein storing vectors selected in predetermined intervals comprises storing vectors with intervals of decreasing size between them.

10.   A method according to claim 3, wherein calculating for a second time the at least some of the state metric vectors comprises calculating the vectors based on the stored vectors.

11.   A method according to claim 3, wherein calculating for a second time the at least some of the state metric vectors comprises calculating at least some of the at least some of the vectors using a reverse function of a function used in the pre-calculating.

12.   A method according to claim 1, wherein calculating for a second time the at least some of the state metric vectors comprises calculating at least some of the at least some of the vectors using a reverse function of a function used in the pre-calculating.

13.   A method according to claim 12, wherein substantially none of the pre-calculated vectors are stored during the pre-calculation.

14.   A method according to claim 12, wherein substantially only pre-calculated vectors from which a next pre-calculated vector is calculated using a non-reversible function, are stored during the pre-calculation.

15.   A method according to claim 13, wherein calculating for the second time comprises calculating at least some of the vectors using the function which was used in the pre-calculation.

16.   A method according to claim 1, wherein the pre-calculating is performed using a function which is an approximation of an original function and calculating for a second time the at least some of the state metric vectors comprises calculating at least some of the at least some of the vectors using a reverse function of the original function.

17.   A method according to claim 1, wherein the pre-calculating is performed using a function which is an approximation of an original function when the original function is non-reversible.

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18.   A method according to claim 1, wherein pre-calculating the state metric vectors from a first side of the block comprises calculating forward state metric vectors.

5   19.   A method according to claim 1, wherein pre-calculating the state metric vectors from a first side of the block comprises calculating backward state metric vectors.

20.   A method according to claim 1, comprising calculating a plurality of state metric vectors from a second side of the block after the pre-calculating of the vectors from the first

10   side of the block.

21.   A method according to claim 1, wherein pre-calculating the state metric vectors comprises pre-calculating a number of vectors substantially of the size of an encoding block.

15   22.   A method according to claim 1, wherein pre-calculating the state metric vectors comprises pre-calculating a number of vectors substantially smaller than the size of an encoding block.

23.   A method of calculating recursive state metric vectors from opposite sides of a block of

20   symbols, the state metric vectors being supplied to an output calculating unit, comprising:

pre-calculating a plurality of state metric vectors from a first side of the block;

storing fewer than all the pre-calculated state metric vectors; and

calculating state metric vectors from a second side of the block after pre-calculating the plurality of state metric vectors from the first side of the block.

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24.   A method according to claim 23, comprising calculating at least one of the state metric vectors from the first side of the block for a second time after calculating at least one of the state metric vectors from the second side of the block.

30   25.   A method according to claim 24, wherein calculating at least one of the state metric vectors from the first side of the block for a second time comprises calculating the at least one of the state metric vectors from the stored vectors.

26.   A method according to claim 25, wherein storing fewer than all the pre-calculated vectors comprises storing vectors calculated in predetermined intervals.

27.   A method according to claim 24, wherein calculating the at least one of the state metric vectors comprises calculating based on a closest stored vector.

28.   A method according to claim 23, comprising supplying the output calculating unit with pairs of corresponding state metric vectors from opposite sides of the block.

29.   A method according to claim 23, wherein the block of symbols is divided into a plurality of segments defined by the stored vectors and comprising calculating for substantially all the segments at least one of the vectors for a second time based on the respective stored vectors of the segment.

30.   A method according to claim 29, wherein calculating for substantially all the segments comprises calculating for all the segments except the first segment.

31.   A method according to claim 29, comprising storing the at least one of the vectors which was calculated for the second time.

32.   A method according to claim 29, wherein calculating the at least one of the vectors for the second time comprises calculating substantially all the non-stored vectors of the segment.

33.   A method according to claim 32, comprising storing substantially all the vectors of the segment which were calculated for the second time.

34.   A method according to claim 32, comprising calculating at least one of the vectors from the first side of the block for at least a third time.

35.   A method of calculating recursive state metric vectors of a block of symbols, the state metric vectors being supplied to an output calculating unit, comprising:

    calculating a plurality of state metric vectors representing a first side of the block using a first function; and

calculating a plurality of state metric vectors representing the first side of the block using a second function different from the first function.

36. A method according to claim 35, wherein the first function is identical to a third

5 function when the third function is reversible and is received by adding a small value to the third function when the third function is non-reversible.

37. A method according to claim 35, wherein the second function is substantially a reverse of the first function.

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38. A method according to claim 35, wherein the first function comprises an approximation of a third function and the second function comprises a substantial reverse of the third function.

39. A method according to claim 35, wherein the first function comprises a log MAP

15 function.

40. A method according to claim 35, wherein calculating the plurality of vectors using the first function comprises calculating substantially all the vectors representing the first side of the block.

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41. A method of calculating recursive state metric vectors of a block of symbols, the state metric vectors being supplied to an output calculating unit, comprising:

    calculating a plurality of state metric vectors representing a first side of the block recursively based on immediately preceding vectors in the block; and

25   calculating a plurality of state metric vectors representing a second side of the block based on immediately preceding vectors in the block.

42. A method according to claim 41, wherein calculating the plurality of vectors representing the first and second sides of the block comprises calculating pairs of vectors

30 representing first and second sides of the block, substantially concurrently.

43. A state metric calculation unit, comprising:

circuitry for recursively calculating state metric vectors from a first side of a block including a predetermined number of symbol groups; and

a memory for storing state metric vectors which has a maximal storage space for state metric vectors substantially smaller than that required to store the predetermined number of state metric vectors.

44.   A calculation unit according to claim 43, wherein the maximal storage space of the memory has room for storing less than fifty percent of the predetermined number of state metric vectors.

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45.   A calculation unit according to claim 43, wherein the maximal storage space of the memory has room for storing less than twenty percent of the predetermined number of state metric vectors.

15   46.   A calculation unit according to claim 43, wherein the circuitry implements a plurality of different functions for calculating the state metric vectors.

47.   A calculation unit according to claim 46, wherein the circuitry implements a pair of functions for calculating the state metric vectors which pair comprise mutual reverse functions.

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48.   A calculation unit according to claim 43, wherein the memory comprises a long term storage area for storing pre-calculated state metric reference vectors in predetermined intervals and a short term storage area for storing state metric vectors between two reference vectors.

25   49.   A calculation unit according to claim 48, wherein the long term storage area serves for storing also state metric vectors from between two reference vectors.